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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/552,529

10/11/2005

Jae Hyun Lee

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EXAMINER

ARCIERO, ADAM A

ART UNIT

PAPER NUMBER

1795

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/552,529	<b>Applicant(s)</b> LEE ET AL.	
	<b>Examiner</b> ADAM A. ARCIERO	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 October 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/11/2005 and 03/16/2007</u> .                               | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Summary***

1. This is the initial Office action based on the Cathode Active Material Comprising Additive for Improving Overdischarge-Performance and Lithium Secondary Battery Using the Same application filed on 10/11/2005.
2. Claims 1-10 are currently pending and have been fully considered.

### ***Priority***

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Objections***

4. Claims 4 and 10 are objected to because of the following informalities: on line 2 of the aforementioned claims recite “at lest” which appears to be a typo and should read “at least”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 4 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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As to Claims 4 and 10, the Applicant claims “The cathode active material according to claim 1, wherein the lithium manganese oxide is at least one material selected from the group consisting of:...” and then lists several lithium transition metal oxides not containing manganese. The Examiner is unsure as to what the Applicant is claiming, the lithium manganese oxide or the lithium transition metal oxide. Based on the specification (paragraph [0032] of the PGPub 10/552529), for examination purposes, the Examiner reads this limitation as the material being a lithium transition metal oxide and not a lithium manganese oxide.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1-2, 4-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over MANABU et al. (JP 2002-100357 A).

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As to Claims 1 and 4, MANABU et al. discloses a lithium secondary battery comprising a positive active material layer wherein said active material layer comprises a lithium-transition metal oxide of  $\text{Li}_x\text{CoO}_2$  wherein  $0.9 \leq x \leq 1.1$ , capable of lithium ion intercalation/deintercalation. Said active material also comprises a lithium manganese oxide represented by  $\text{Li}_x\text{Ni}_y\text{Mn}_{1-y-z}\text{M}_z\text{O}_2$  with  $0.9 \leq x \leq 1.2$ ;  $0.4 \leq y \leq 0.6$  and  $0 \leq z \leq 0.2$ ; which is in the form of a R-3-m rhombohedron structure (layered structure) and wherein M can be Cr (paragraph [0009]). MANABU et al. does not expressly disclose wherein the lithium manganese oxide is represented by  $\text{LiM}_x\text{Mn}_{1-x}\text{O}_2$  where  $0.05 \leq x \leq 0.5$  and M is at least Cr, Al, Ni, Mn and Co. However, z can equal zero in MANABU et al. giving a structure of  $\text{Li}_x\text{Ni}_y\text{Mn}_{1-y}\text{O}_2$  with  $0.4 \leq y \leq 0.6$  and  $0.9 \leq x \leq 1.2$ . The ranges for x encompasses the value of Li in the instant application and the range for y overlaps the range of x in the instant application. The courts have held that in the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

As to Claim 2, MANABU et al. teaches a lithium manganese oxide having a layered structure as discussed above, wherein said structure has a content of 20-70% by weight (paragraph [0013]). This range overlaps the claimed range. The courts have held that in the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

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As to Claim 5, MANABU et al. discloses a lithium secondary battery having an anode ([0026]), a cathode ([0008]), a separator ([0023]), a nonaqueous electrolyte comprising an electrolyte compound ([0022]) and a salt ([0023]), and the cathode active material as discussed above in claim 1.

As to Claim 6, MANABU et al. teaches the formula 1 starting material, however MANABU et al. does not expressly disclose wherein the lithium manganese oxide having a layered structure changes to a spinel structure after the first charge/discharge. However, it is the position of the Examiner that such properties are inherent, given that both MANABU et al. and the present application utilize the same cathode active material with the same lithium manganese oxide as an additive. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*, *In re Robertson*, 49 USPQ2d 1949 (1999).

As to Claim 7, MANABU et al. teaches a nonaqueous electrolyte employing a lithium salt such as  $\text{LiPF}_6$  ([0023]).

As to Claim 8, MANABU et al. teaches a lithium manganese oxide having a layered structure as discussed above, wherein said structure has a content of 20-70% by weight (paragraph [0013]). This range overlaps the claimed range. The courts have held that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

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As to Claim 10, MANABU et al. teaches the lithium transition metal oxide as being  $\text{Li}_x\text{CoO}_2$  where  $0.9 \leq x \leq 1.1$  ([0009]) which encompasses the claimed value of 1. The courts have held that in the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

10. Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over MANABU et al. (JP 2002-100357 A) as applied to claims 1 and 5 above, and further in view of HASEGAWA et al. (US 5,609,975 A).

As to Claims 3 and 9, MANABU et al. does not expressly disclose a lithium manganese oxide having a layered structure of  $\text{LiCr}_{0.1}\text{Mn}_{0.9}\text{O}_2$ .

However, HASEGAWA et al. teaches of a positive active material represented by  $\text{Li}_x\text{A}_{1-y}\text{M}_y\text{O}_2$  where A can be Mn and M can be Cr and  $0.05 \leq x \leq 1.1$  and  $0 \leq y \leq 0.5$ . These ranges encompass the claimed values for Li, Cr and Mn. The courts have held that in the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Therefore, at the time of the invention, a person having ordinary skill in the art would have found it obvious to substitute the lithium manganese oxide containing chromium of HASEGAWA et al. for the lithium manganese oxide of MANABU et al. so as to provide a lithium secondary battery having excellent properties, as taught by HASEGAWA et al. (col. 2, lines 18-20).

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***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADAM A. ARCIERO whose telephone number is (571)270-5116. The examiner can normally be reached on Monday to Friday 8am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AA

/SUSY N TSANG-FOSTER/  
Supervisory Patent Examiner, Art Unit 1795